MEMORANDUM FOR   Chester E. Bowie
                                Chief, Demographic Surveys Division

From: Alan R. Tupek
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Subject: American Housing Survey - Metropolitan Sample (AHS-MS):
                                1998 Specifications for Weighting Redesigned Sample

I.   INTRODUCTION

This memorandum contains the specifications for computing the final weights needed for the redesigned areas in the 1998 AHS-MS sample. These specifications apply to all of the other redesigned areas that will be interviewed in future enumerations, but not to the nonredesigned areas that will be interviewed in the future. We will provide separate specifications for the nonredesigned areas.

Terms with an asterisk (*) next to them are defined or explained in the glossary. We have also provided a table of contents at the end of this document.

Section II contains the request for data that can be obtained before the weighting operation. Section III pertains to the AHS-MS weighting procedure. Section IV contains all output requests.

DSMD will provide all weighting factors, scale values*, and controls electronically in ASCII files. Accompanying the descriptions of the weighting factors in Section III and Section IV, are the names of the files and the locations in which the factors are located. Use these files to obtain all information necessary in the weighting process. Attachment A contains the layout of these files. Other attachments to these specifications contain a hard copy of all information in the files for documentation purposes.

There are 15 MSAs in the 1998 sample. This sample was drawn from three sources, the 1990 census unit frame* universe, the 1990 census area frame universe, and the permit new construction universe. The definitions of the metropolitan areas are based on the 1990 census.

Listed below are the 15 MSAs.

<   Baltimore, MD PMSA

<   Birmingham, AL MSA

<   Boston, MA-NH PMSA

<   Cincinnati, OH-KY-IN PMSA

<   Houston, TX PMSA

<   Minneapolis-St. Paul, MN-WI MSA

<   Norfolk-Virginia Beach-Newport News, VA-NC MSA

<   Oakland, CA PMSA

<   Providence-Warwick, RI-MA MSA

<   Rochester, NY MSA

<   Salt Lake City-Ogden, UT MSA

<   San Francisco, CA PMSA

<   San Jose, CA PMSA

<   Tampa-St. Petersburg-Clearwater, FL MSA

<   Washington-DC-MD-VA PMSA

Before beginning the weighting process, the AHS-MS master file as documented in the March 26, 1998 memorandum to Chester E. Bowie, A1998 American Housing Survey - Metropolitan Sample (AHS-MS): Creation of the Master File,@ should already have been created and contain all necessary information from the Unit Control File.

Be sure to blank out the MCD codes on the weighting file for all AHS-MS areas except for Boston and Providence since the Master File includes MCD codes for all AHS-MS areas.

II.   COMPUTING THE MIDPOINT

For the 1998 AHS-MS, provide LSB with the midpoints before the edits, so we can define the subareas using zones (missing interview dates will be filled during the edits). Calculate the final midpoints after the edits are complete. There will be one midpoint for each of the 15 metropolitan areas.

Via the instrument, FLD will provide DSD with the date each unit was completed (interviews and noninterviews). Using the interview results, compute the midpoint by determining the mean date when the cases were interviewed.

Use the following procedure to calculate the mean date:

< Determine what proportion of the workload was interviewed each day of the interview period.
< Multiply this proportion by the number of days of the year that have transpired.
< Sum up these products and convert this number to a date.

For example, assume 25% of the cases were interviewed on July 10, 1998, 50% were interviewed July 20, 1998 and 25% were interviewed on August 21, 1998. The midpoint would be calculated as follows:

.25 times 191 (July 10 is the 191st day of 1998)	= 47.8
+.50 times 201 (July 20 is the 201st day of 1998)	= 100.5
+.25 times 233 (August 21 is the 233rd day of 1998)	= 58.3
	206.6

Round the midpoint day to the next day. Thus, the midpoint in this example is the 207th day of the year or July 26, 1998.

III.   WEIGHTING PROCEDURE

Each housing unit record (interviews and noninterviews alike) on each of the regular data files for the 1998 redesigned MSAs will receive a weight.   Include Type C noninterviews from previous enumerations. (In 1998 there are no previous enumerations.)

Part A through Part I of this section contain detailed steps on how to determine the final weight. Beginning with Part A apply each weight and factor step-by-step to the appropriate housing unit records.

After completion of Part A through Part J, the final weight will be the product of the following components:

< Basic Weight (BW)
< Panel* Reduction Factor (PR)
< Group Quarters Reduction Factor (GQRF)
< Permit Subsampling Factor* (PSF)
< Weighting Control Factor* (WCF)
< Missing Cluster Factor (MCF)
< Type A Noninterview* Adjustment Factor (TAF)
< Unit Frame Ratio Estimation Factor (UFREF)
< Mobile Home Ratio Estimation Factor (MHREF)
< Independent Total Housing Unit Ratio Estimation Factor (ITHUREF)

Multiply the above weights and factors to determine the final weight. The final weight will be

BW x PR x GQRF x PSF x WCF x MCF x TAF x UFREF x MHREF x ITHUREF.

Save the basic weight and all of the above factors on each record.

FOR EACH STEP IN THE WEIGHTING PROCEDURE WHERE A SPECIFIC FACTOR WAS NOT CALCULATED, ASSIGN A VALUE OF 1.00 TO THE FACTOR.

Assign a value of zero to the normal final weight location on the records for all

< out-of-scope* units.
< zero segments*.
< noninterviews.

Assign these units a final weight composed of the above components, but store it in a separate location.

A.   Basic Weight

FILE NAME: Master File
LOCATION:
ATTACHMENT: B

Match to the master file to get the Basic Weights.

The weight is now equal to *BW*.

B.   **Panel Reduction Factor**

FILE NAME: FILE-1
LOCATION: 6-13
ATTACHMENT: C

The following panel reductions were made in 1998:

<   In Boston, all units in panels 5, 9 and 11 were reduced.
<   In Houston, all units in panels 5, 7, 9 and 11 were reduced.
<   In Salt Lake City, half of panel 11 was reduced.

To adjust the basic weights to account for these panel reductions, multiply the basic weights by the panel reduction factors (PR) provided.

Exclude all units in the Group Quarters frame from this adjustment.

The new weight is *BW x PR.*

C.   **Group Quarters Reduction Factor**

FILE NAME: FILE-1
LOCATION: 15-22
ATTACHMENT: C

In the GQ frame, as documented in the May 17, 1996 memorandum to Mackey Lewis, AAHS-MS: Reduction of Group Quarters (GQ) Segments from the 1995-1997 Enumerations,@ several GQ segments were reduced from 1998 sample areas.

In addition, since most MSAs have only a few GQ segments, the effect of the panel reduction is not accurately represented by the application of an across-the-board panel reduction factor. Therefore, we computed an MSA specific panel reduction factor for GQ segments.

To adjust the weights of segments in the GQ frame for the GQ reduction and the panel reduction, multiply the basic weight on each GQ segment in a given MSA by the appropriate factor supplied.

For segments in all other frames, the GQRF = 1.000.

The new weight is *BW x PR x GQRF*.

D.   Permit Subsampling Factor

Match to the AHS-MS master file to obtain the appropriate Permit Subsampling Factor (PSF).

To apply the permit subsampling factor, multiply the unit=s current weight by the factor. The new weight is then *BW x PR x GQRF x PSF*.

E.   Weighting Control Factor

The 1998 Weighting Control Factors (WCFs) are determined according to the February, 1995 memorandum from the Output Systems Workgroup to Petty, APreparation of 1990 Design Weighting Control Files for All 1990 Design Surveys@ (Doc.#9WT-S-4).

Match the AHS-MS master file by field PSU*, segment number, and segment suffix to the WCF file referred to in the above specified memorandum and apply the weighting control factors to the basic weight for specified records on an individual basis. Assign the weighting control factor for a given segment to all units in the segment.

The new weight is *BW x PR x GQRF x PSF x WCF*.

F.   Missing Cluster Factor

Since we will receive data on a flow basis for future AHS-MS weighting operations, we need to build an inflation factor into the weighting process to account for the data not yet received. We will call this inflation factor the Missing Cluster Factor (MCF). For cluster 1 data, the MCF is 9/3. For clusters 1 and 2 combined, the MCF is 9/7. For clusters 1, 2 and 3 combined, the MCF is 9/8. Once the data for all of the clusters has been added to the weighting file, the MCF=1.000.

The new weight is *BW x PR x GQRF x PSF x WCF x MCF*.

G.   Type A Noninterview Adjustment Factor

FILE NAME: FILE-4
LOCATION: Table Format
ATTACHMENT: D

We will use prior year data to define the Type A noninterview cells for future AHS-MS enumerations. We will discuss this with DSD to determine the best way to create a prior year data file in terms of reassigning stratum codes* and adjusting for inflation.

Compute noninterview adjustment factors separately for occupied interviewed housing units* and vacant*/URE* interviewed housing units.

1. Occupied Interviewed Housing Units

Include in all noninterview adjustment calculations and applications in this section:

<regular occupied interviewed units.
<Type A noninterview units with NOINT = 1, 2, 3, 4, 5 or 6 and VACNOINT is blank (designated by **.**).

Exclude from all noninterview adjustment calculations and applications:

<URE interviewed units.
<vacant interviewed units.
<out-of-scope units.
<Type A noninterview units with NOINT = 6 and VACNOINT=1.
<Type B noninterview units*.
<Type C noninterview units*.

Calculate the noninterview adjustment factors separately according to the following three mutually exclusive divisions. Additionally, calculate an overall noninterview adjustment factor for each of these divisions. In other words, calculate factors for each cell and a summary factor for each division. There will be 3 overall factors for each MSA.

(1) All housing units which fall into one of the following categories:

<housing units with stratum codes 1-190 in the unit frame.
<housing units with stratum codes 1-190 in the area frame.
<housing units with stratum codes 1-190 in the area/unit frame.

Housing units are classified into noninterview cells based on their stratum codes.

Most housing units in the unit frame have stratum codes that were assigned during the redesign sample selection. Extra units* in the unit frame were assigned stratum codes when they were added to the master file.

Refer to Tables 1 and 2 in Attachment D for cell classification documentation. These tables show the stratum codes that define each noninterview cell. For example, the cell for all renters in central city* and balance* having 4 rooms and a rent of less than $124 at the time of the 90 Census consists of all units having stratum codes 34 and 35.

Note that each table will be used to compute factors twice, once for central city and once for balance.

(2)   All housing units which fall into one of the following categories:

<housing units without stratum codes in the area frame.
<housing units without stratum codes in the area/unit frame.
<housing units in the GQ frame.
<housing units with stratum code 191 in the unit frame.

Group these housing units within each MSA using the following characteristics into the cells in Table 3 of Attachment D:

<mobile home/conventional units*.
<central city/balance.
<current year tenure* status.
<frame.

(3)   All housing units in the permit frame.

Within central city and balance by current year tenure status, group these housing units into old new construction* and new new construction.*

Refer to Table 4a in Attachment D to classify these housing units into cells.

CALCULATION

1.   For each of the noninterview tables (Tables 1-4a in Attachment D) obtain the

following counts.

Let   WIC$_i$=   weighted count (currently BW x PR x GQRF x PSF x
                       WCF x MCF) of occupied interviewed housing units
                       for each cell,

WNIC$_i$ =   weighted count of Type A noninterview housing units for each
                 cell,

UIC$_i$=   unweighted count of occupied interviewed housing units for
                 each cell, and

UNIC$_i$ =   unweighted count of Type A noninterview housing units for each
                 cell.

2.   Compute the factor using Tables 5-10 in Attachment D and the following steps.

Step 1   Start with the cell in Table 5 having the smallest scale value. (At
              the beginning of this process, for example, the smallest scale
              value, 1, appears in the cell for renters with 5+ rooms and a
              rent of less than $124.)

Step 2 Compute the noninterview adjustment factor,

$$TAF = \frac{WIC_i + WNIC_i}{WIC_i}$$

If the cell satisfies both conditions,
(a) UIC$_i$ $ 20 if UNIC$_i$ > 0,
(b) TAF < 1.500
then go to Step 7. If the cell does not satisfy both conditions, go
to Step 3.

Step 3   Collapse the cell with the cell having the nearest scale value
              (smallest absolute difference).

Step 4   Compute the scale value for the newly created cell by taking the
              average of the two scale values.

$$New\ Scale\ Value = \frac{Scale\ Value_1 + Scale\ Value}{2}$$

Step 5   Compute the noninterview adjustment factor for the collapsed

$$TAF = \frac{WIC_i + WNIC_i}{WIC_i}$$

cell.

where WIC_i =   the sum of the weighted counts of
                       occupied interviewed housing units for
                       the two cells collapsing together, and

$WNIC_i$ =   the sum of the weighted count of Type
                       A noninterview housing units for the
                       two cells collapsing together.

Step 6   Go to Step 2.

Step 7   Select the cell with the next highest scale value.

Step 8   Go to Step 2.

          Repeat the steps until all cells or collapsed cells in Tables 5-10
          of Attachment D satisfy the conditions in
          Step 2.

APPLICATION

To apply the noninterview adjustment factors:

1.   For each occupied interviewed housing unit, determine to which final
      (after collapsing) noninterview cell it belongs.

2.   Multiply the unit=s present weight (BW x PR x GQRF x PSF x WCF x MCF) by the factor calculated for the noninterview cell.

Thus, the new weight is BW x PR x GQRF x PSF x WCF x MCF x TAF.

Assign a value of 1.00 to the TAF for all units for which a TAF was not calculated.

Save the Type A Noninterview Adjustment Factors.

2.   Vacant/URE interviewed units

Include in all noninterview adjustment calculations and applications in this section:

<URE interviewed units.
<vacant interviewed units.
<Type A noninterview units with NOINT = 6 and VACNOINT=1.

Exclude from all noninterview adjustment calculations and applications:

<regular occupied interviewed units.
<out-of-scope units.
<Type A noninterview units with NOINT = 1, 2, 3, 4, 5, 6 and VACNOINT is blank (designated by **.**).
<Type B noninterview units.
<Type C noninterview units.

Calculate the noninterview adjustment factors for all vacant/URE interviewed housing units. Additionally, calculate an overall noninterview adjustment factor for these units. There will be 1 overall factor for each MSA.

Group these housing units by central city and balance.

Refer to Table 4b in Attachment D to classify these housing units into cells.

CALCULATION

Calculate the Type A Noninterview Factors for vacant/URE units using the procedure described in Section III.G.1 replacing references to occupied interviewed housing units with interviewed vacant/URE units.

APPLICATION

To apply the noninterview adjustment factors:

1.   For each vacant/URE interviewed housing unit, determine to which final (after collapsing) noninterview cell it belongs.
2.   Multiply the unit=s present weight (BW x PR x GQRF x PSF x WCF x MCF) by the factor calculated for the noninterview cell.

Thus, the new weight is BW x PR x GQRF x PSF x WCF x MCF x TAF.

Assign a value of 1.00 to the TAF for all units for which a TAF was not calculated.

Save the Type A Noninterview Adjustment Factors.

H.   Unit Frame Ratio Estimation Factor

Ratio Estimation Cells (same as Type A noninterview cell Tables 1 & 2 in Attachment D)
FILE NAME: FILE-4
LOCATION: Table Format
ATTACHMENT: D

Control Counts
FILE NAME: FILE-2
LOCATION: Table Format
ATTACHMENT: E

Note that each of the ratio estimation cell tables will be calculated once for central city and once for balance.

Calculate a factor for each collapsed cell (described below) and an overall factor.

Include in the computation of this factor the following housing units from the unit frame only:

< interviewed housing units* (including out-of-scope units) from the unit frame,
< Type B noninterviews from the unit frame,
< Type C noninterviews from the unit frame; make sure to include units that were Type C noninterviews during all previous enumerations. (Note that in 1998 there are no previous enumerations.)

Exclude from the computation of the Unit Frame Ratio Estimation Factor (UFREF):

< extra units from the unit frame,
< Type A noninterviews from the unit frame,
< units with stratum code 191.

<u>CALCULATION</u>

1. For each of the ratio estimation tables (Tables 1 & 2 in Attachment D) obtain the following counts.

   Let $1990CC_i$ = weighted 1990 census counts by cell of housing units from the unit frame; obtain the appropriate number for each cell from the file,

   WIC_i = weighted counts (current weight is *BW x PR x GQRF x PSF x WCF x MCF x TAF*) of housing units for the cell. Use the stratum code to classify the housing units into cells.

   UIC_i = unweighted counts of housing units for the cell. Use the stratum code to classify the housing units into cells.

2.   Compute the factor using Tables 5-8 in Attachment D and the
      following steps.

Step 1   Start with the cell in Table 5 having the smallest scale value.
         (At the beginning of this process, for example, the smallest
         scale value, 1, appears in the cell for renters with 5+ rooms
         and a rent of less than $124.)

$$UFREF = \frac{1990\,CC_i}{WIC_i}$$

Step 2   Compute the unit frame ratio estimation factor. If the cell
         satisfies both conditions,
         (a) $UIC_i \$ 20$,
         (b) $.667 < UFREF < 1.500$
         then go to Step 7. If the cell does not satisfy both conditions,
         go to Step 3.

Step 3   Collapse the cell with the cell having the nearest scale value
         (smallest absolute difference).

Step 4   Compute the scale value for the newly created cell by taking
         t
         h
         e $$New\,Scale\,Value = \frac{Scale\,Value_1 + Scale\,Value_2}{2}$$

         a
         v
         e
         rage of the two scale values.

Step 5   Compute the unit frame ratio estimation factor for the
         collapsed cell.

$$UFREF = \frac{1990\,CC_i}{WIC_i}$$

where 1990CC$_i$ =   sum of the weighted 1990 census counts of housing units for the two collapsed cells, and

WIC$_i$ =   sum of the weighted counts of housing units for the two collapsed cells.

Step 6 Go to Step 2.

Step 7 Select the cell with the next highest scale value.

Step 8 Go to Step 2.

Repeat the steps until all cells or collapsed cells in Tables 5-8 satisfy the conditions in Step 2.

3.   Calculate an overall UFREF where

1990CC=   weighted 1990 census counts of housing units from the unit frame in the MS; obtain the appropriate number by adding all the control numbers in both the central city and the balance of the MS together,

WIC$_i$ =   weighted counts (current weight is *BW x PR x GQRF x PSF x WCF x MCF x TAF*) of housing units in the unit frame for the MS.

The overall factor is then

$$UFREF = \frac{1990\,CC_i}{WIC_i}$$

Application

For each of the following types of housing units, determine to which final (after collapsing) cell it belongs and apply the factor calculated for that cell.

- < All interviewed housing units in the unit frame.
- < Extra units in the unit frame; assign these units to the same cell to which units with identical segment numbers are assigned to.
- < Type B noninterviews in the unit frame.
- < Type C noninterviews in the unit frame.

Do not apply the **overall** UFREF to any housing units.

For all other types of housing units, assign a value of 1.00 to the factor.

The new weight is *BW x PR x GQRF x PSF x WCF x MCF x TAF x UFREF*.

I.   Mobile Home* Ratio Estimation Factor

Mobile Home Collapsing Code   Monthly Mobile Home Controls

FILE NAME: FILE-3 FILE NAME: dsdmhest.wb2
LOCATION: 9-10   LOCATION: k:\ahs98
ATTACHMENT   F

Computing the Mobile Home Independent Estimates

Using the midpoint date calculated in Section II., interpolate between monthly estimates provided by LSB to come up with the mobile home independent estimate for the midpoint.

Use the following formula for interpolation, assume the midpoint falls between month i and month i+1:

$$(D_m - D_i)/(D_{i+1} - D_i) = (x - Q_i)/(Q_{i+1} - Q_i)$$

Solving for x:

$$x = [((Q_{i+1} - Q_i)(D_m - D_i))/(D_{i+1} - D_i)] + Q_i$$

where D_m = day of the year where the midpoint date falls;

D_i = day of the year where the ith monthly estimate falls;
D_{i+1}= day of the year where the i+1 monthly estimate falls;
Q_i = ith monthly estimate;
Q_{i+1}= i+1 monthly estimate;
x = mobile home estimate for the midpoint date.

For example, July 26, 1998 (midpoint date) falls between the months of July and August. We will need to determine the estimate for
July 26, 1998 by interpolating between the estimates for the seventh and eighth months. The estimate for the seventh month of 1998 is 65,400 (July 1, 1998) and the estimate for the eighth month of 1998 is 72,500 (August 1, 1998). July 1st is the 182nd day of 1998, July 26th is the 207th day of 1998 and August 1st is the 213th day of 1998. Using this information in the above formula for x, produces the following mobile home control for the midpoint date:

$$x = [(72,500-65,400)(207-182)/(213-182)]+65,400$$
$$x = 71,125.81$$

Round the estimate to the nearest whole number. Thus the mobile home estimate for July 26, 1998 is 71,126.

Do this for each county/MCD and then sum the county/MCDs to the subarea level.

Computing the Mobile Home Ratio Estimation Factor

For the first run of the MHREF, DSD will use the initial MH collapsing codes provided on FILE-3. DSD will provide us with the mobile home estimates and the MHREF. After we review this output, we will provide DSD with new collapsing codes.

Calculate the mobile home ratio estimation factor separately for each geographic area or group of geographic areas within each MSA. The geographic areas, which are defined using state and county codes or MCD/CCD codes, as well as the mobile home collapsing codes are located in Attachment F.

NOTE: For the initial run, we will not collapse any of the geographic areas. We will give DSD a file with the collapsing codes that accomplish this. When we review the initial results and

determine final collapsing codes, we will include them in the attachment.

Compute a MHREF for each set of collapsed geographic areas. If the collapsing code = 0 for all the geographic areas in an MSA, do not compute a mobile home ratio estimation factor (MHREF) for the MSA. Otherwise, compute the MHREF by combining all geographic areas with the same collapsing code. The number of MHREFs to be computed for each MSA will be equal to the largest value in the collapsing code field for that MSA. For example, in the Cincinnati OH, PMSA collapse geographic areas 1 and 2 to compute only one MHREF for these two geographic areas and a total of two MHREFs for the Cincinnati MSA.

Additionally, in MSAs which require more than one MHREF for the entire MSA, calculate an overall mobile home ratio estimation factor for each MSA which will include all geographic areas.

Include all in-scope mobile home interviews.

Exclude
< all noninterviews,
< in-scope nonmobile home interviews,
< all out-of-scope interviews (Because of the manner in which out-of-scope units and mobile homes are defined, it is not possible to have an out-of-scope mobile home).

CALCULATION

1. Numerator (Independent Estimate) - Within the MSA, add together the mobile home independent estimates for all geographic areas with the same mobile home collapsing code. For example, in the Cincinnati OH, PMSA, add the mobile home independent estimates for area 1 and area 2 together to obtain the numerator.

2. Denominator (Sample Estimate) - Calculate the weighted estimate of interviewed mobile homes (current weight is *BW x PR x GQRF x PSF x WCF x MCF x TAF x UFREF)* for the group of areas which collapse together (same areas as in the numerator).

3. The factor is

$$MHREF = \frac{\text{Independent Estimate of MHs in Collapsed Areas}}{\text{Sample Estimate of MHs in Collapsed Areas}}$$

4. The overall MHREF for the whole MSA, with geographic areas 1 through N, uses the same numbers in the numerator and denominator and is

$$MHREF = \frac{\text{Independent Estimates of MHs in Area 1 + . . . + Area N}}{\text{Sample Estimates of MHs in Area 1+. . . Area N}} \;.$$

Application

For each MSA where a MHREF was computed, apply the factor computed at the collapsed geographic area level to:

<   occupied interviewed mobile homes.
<   vacant /URE - in scope mobile homes.
<   mobile home Type A noninterviews.
<   mobile home Type B noninterviews.

Do not apply the **overall** MHREF to any housing units.

Apply a factor of 1.000 to all other units.

For MSAs where you do not compute a factor, apply a factor of 1.000 to all units including interviewed mobile homes within that MSA.
The new weight is thus *BW x PR x GQRF x PSF x WCF x MCF x TAF x UFREF x MHREF.*

J.   Independent Total Housing Unit Ratio Estimation Factor

Total Housing Unit Collapsing   Monthly Mobile Home Controls
Code

FILE NAME: FILE-3 FILE NAME: dsdmhest.wb3
LOCATION: 12-13   LOCATION: k:\ahs98
ATTACHMENT: G

Monthly Total Housing Unit Controls
FILENAME: dsdctl98.ssd01
LOCATION: dsmde1: /ahsms/98wgt

Computing the Total Housing Unit Independent Estimates

Using the midpoint date calculated from Section II. and the formula
presented in Section III.I., interpolate between monthly estimates provided
by LSB to determine an independent estimate for the midpoint.

Do this for each county/MCD and then sum the county/MCDs to the
subarea level.

In the future, these monthly controls will be provided by POP.

*Computing the Total Independent Housing Unit Ratio Estimation
Factor*

For the first run of the ITHUREF, DSD will use the initial total housing unit
collapsing codes provided on FILE-3. DSD will provide us with the
independent estimates of total housing units and the ITHUREF. After we
review this output, we will provide DSD with new collapsing codes.

Attachment G contains the total housing unit collapsing code. **Note that the
collapsing order for the ITHUREF is not necessarily the same as it
was for the MHREF.**

If the total housing unit collapsing code = 0 for all the geographic areas in an
MSA, do not compute an ITHUREF for the MSA. Otherwise, compute the
ITHUREF by combining all geographic areas with the same collapsing code.
 The number of ITHUREFs to be computed for each MSA will be equal to
the largest value in the collapsing code field for that MSA. Calculate the
independent total housing unit ratio estimation factors (ITHUREFs)
separately for each geographic area within each MSA. The geographic
areas, which are defined using state and county codes or MCD/CCD codes,
are in Attachment G.

Before calculating the ITHUREF, determine if a MHREF was computed for
any of the geographic areas by referring to Attachment F.

IF A MHREF Was Computed:

Exclude from the calculation:

<   mobile homes,
<   out-of-scope units,
<   all noninterviewed units.

CALCULATION

1.   Numerator (Adjusted Independent Estimate):

       <   within an MSA, add together the independent estimates (directly from the file) of all geographic areas with the same total housing unit collapsing code; use the total housing unit collapsing codes in Attachment G, **not** the mobile home collapsing codes in Attachment F.

       <   to compute the adjusted independent estimate in Area i, determine the sample estimate of mobile homes in Area i after application of the mobile home factor.

       <   subtract the sample estimate of mobile homes in Area i from the independent estimate.

2.   Denominator (Sample Estimate) - Determine the weighted estimate (current weight is *BW x PR x GQRF x PSF x WCF x MCF x TAF x UFREF*) of interviewed housing units for all geographic areas which collapse together (same as in the numerator).

3.   The factor for the collapsed geographic areas is

$$\text{ITHUREF} = \frac{\text{Adjusted Independent Estimate of HUs in Collapsed Areas}}{\text{Sample Estimate of Hus in Collapsed Areas}}$$

4. The overall ITHUREF for the whole MSA, with geographic areas 1 through N, uses the same numbers in the numerator and denominator and is

$$\text{ITHUREF} = \frac{\text{Adjusted Independent Estimate of HUs in Area } 1 + \ldots + \text{Area N}}{\text{Sample Estimate of HUs in Area } 1 + \ldots + \text{Area N}} \; .$$

APPLICATION

Apply only the ITHUREF computed at the collapsed geographic area level to:

<   occupied housing units, excluding mobile homes,
<   vacant/URE housing units, excluding mobile homes,
<   Type A noninterviews, excluding mobile homes,
<   Type B noninterviews, excluding mobile homes,
<   Type C noninterviews, excluding mobile homes,
<   out-of-scope units, excluding mobile homes.

Do not apply the **overall** ITHUREF to any housing units.

If A MHREF Was *Not* Computed:

Exclude:
<   out-of-scope units.
<   all noninterviewed units.

Include all other units (including mobile homes).

CALCULATION

1. Numerator (Independent Estimate) - Within an MSA, add together the independent estimates (directly from the file) of all geographic areas with the same total housing unit collapsing code. Use the total housing unit collapsing codes in Attachment G, **not** the mobile home collapsing codes in Attachment F.

2.   Denominator (Sample Estimate) - Determine the weighted estimate (current weight is *BW x PR x GQRF x PSF x WCF x MCF x TAF x UFREF*) of the sum of interviewed housing units for the areas which collapse together.

3.   The factor for the collapsed geographic areas is

$$\text{ITHUREF} = \frac{\text{Independent Estimate of HUs in Collapsed Areas}}{\text{Sample Estimate of HUs in Collapsed Areas}}.$$

4.   The overall ITHUREF for the whole MSA with geographic areas 1 through N uses the same numbers in the numerator and denominator and is

$$\text{ITHUREF} = \frac{\text{Independent Estimate of HUs in Area 1} + \ldots + \text{Area N}}{\text{Sample Estimate of HUs in Area 1} + \ldots + \text{Area N}}.$$

APPLICATION

Apply only the ITHUREF computed at the collapsed geographic area level to:

<   occupied housing units (including mobile homes),
<   vacant/URE housing units (including mobile homes),
<   out-of-scope units (including mobile homes),
<   Type A noninterviews (including mobile homes),
<   Type B noninterviews, (including mobile homes),
<   Type C noninterviews (including mobile homes).

Do not apply the **overall** ITHUREF to any housing units.

For all units for which an ITHUREF was not calculated, assign the factor a value of 1.00.

The final weight is *BW x PR x GQRF x PSF x WCF x MCF*
x TAF x UFREF x MHREF x ITHUREF.

IV. OUTPUT

All output listed below is requested separately for each MSA.

Please provide row and column totals for all counts in the printouts unless otherwise
specified.

For all ASCII file requests, DSMD expects 1 file for each MSA.

We will use the SAS procedure COMPARE to verify that the fields taken from the
Master File are correct.

A. Midpoint

For each MSA, provide an ASCII file containing:

< a distribution of the number of cases completed each day of the
  interview period,
< a distribution of the proportion of the workload completed each day
  of the interview period multiplied by the number of days of the year
  that have transpired. Refer to the example in
  Section II.

There will be a total of 15 ASCII files (one for each MSA).

B. Basic Weight, Panel Reduction Factor, & Group Quarters Reduction Factor

For each MSA, print out the following information for the first five records
from each frame:

< MSA code.
< frame.
< PSU.
< segment.
< segment suffix.
< serial number.
< basic weight.

<   panel reduction factor.
<   group quarters reduction factor.
<   current weight.

C.   Permit Subsampling Factor

For each housing unit to which a PSF other than 1 was applied, provide a
hard copy printout sorted by the permit subsampling flag* and then in order
of the control number within each value of the permit subsampling flag and an
ASCII file with the following information:

<   PSU.
<   segment number.
<   segment suffix.
<   serial number.
<   sector* (central city or balance).
<   panel.
<   basic weight.
<   panel reduction factor.
<   GQ reduction factor.
<   permit subsampling flag of the UCF.
<   permit subsampling factor.
<   product of *BW x PR x GQRF x PSF*.

D.   Weighting Control Factor

For each housing unit to which a WCF other than 1 was applied, print out in
order of the control number:

<   PSU.
<   frame.
<   segment number.
<   segment suffix.
<   serial number.
<   sector (central city or balance).
<   panel.
<   basic weight.
<   panel reduction factor.
<   GQ reduction factor.
<   permit subsampling factor.
<   weighting control factor.

<   product of *BW x PR x GQRF x PSF x WCF.*

Additionally, please supply LSB with a copy of the file provided by LSSPB.

E.   Type A Noninterview Adjustment Factor

Before application of the TAF, the weight is equal to
BW x PR x GQRF x PSF x WCF x MCF .

1.   Provide a hard copy and an ASCII file with the following counts for
        each cell in the noninterview cell Tables 5-10 in Attachment D.

        Provide the following before collapsing:

        <   weighted and unweighted counts of occupied interviewed
                housing units before application of the TAF (WIC, UIC).
        <   weighted and unweighted counts of Type A noninterviews
                before application of the TAF (WNIC, UNIC).
        <   Type A factor (TAF).
        <   scale values (SCALE).

        Refer to Table 1 in Attachment H for an example of the desired
        output format. These tables will be used by DSMD to verify cell
        classification.

2.   Additionally, sort the cells of Tables 5-10 in Attachment D by the
        original scale value (before collapsing) in ascending order. Provide
        hard copies and ASCII files of the following before and after
        collapsing:

        <   scale values (SCALE, CSCALE).
        <   unweighted and weighted counts of occupied interviewed
                housing units (UIC, WIC) before application of the TAF.
        <   unweighted and weighted counts of Type A noninterviews
                (UNIC, WNIC) before application of the TAF.
        <   TAF.

        Provide the following counts only after collapsing:

        <   weighted counts of occupied interviewed housing units

(WFIC) after application of the TAF.

<   weighted counts of Type A noninterviews (WFNIC) after application of the TAF.

Refer to Table 2 in Attachment H for an example of the desired output format. These tables will be used by DSMD to verify the collapsing process.

3.   Repeat steps 1 and 2 for vacant/URE units in Table 11 in Attachment D.

4.   Also, provide a hard copy of the overall TAFs before collapsing.

F.   Unit Frame Ratio Estimation Factor

Before application of the UFREF, the weight is equal to
BW x PR x GQRF x PSF x WCF x MCF x TAF .

1.   Provide a hard copy and an ASCII file of the following information for **each cell** in Tables 5-8 in Attachment D **before collapsing**. Provide a separate table for each sector (central city, balance, total) and each tenure (owner, renter).

> <   weighted and unweighted counts of housing units before the factor is applied (UIC, WIC); include in these counts the same units that make up the denominator of the UFREF (extra units are excluded).

> <   1990 census counts (numerator).
> <   weighted and unweighted counts of extra units (UEXC, WEXC).
> <   weighted counts of housing units before the factor is applied (WICEX); include in these counts the same units that make up the denominator of the UFREF plus (including) extra units.
> <   UFREF.

< scale values (SCALE).

Refer to Table 3 in Attachment H for an example of the desired output format.

These tables will be used by DSMD to verify cell classification.

2. Additionally, sort the cells of Tables 5-8 in Attachment D by the original scale value (before collapsing) in ascending order. Provide a hard copy and an ASCII file of the following information before and after collapsing for **each cell** in Tables 5-8 in Attachment D:

   a. extra units *excluded*
      < scale values (SCALE, CSCALE).
      < unweighted and weighted counts of housing units (UIC, WIC) before the factor is applied; include in these counts the same units that make up the denominator of the UFREF (extra units are excluded).
      < UFREF.
      < 1990 census counts (numerator) (1990CC).

      Provide the following counts only after collapsing:
      < weighted cell counts, (WICA) after application of the UFREF.

   b. extra units *included*
      < scale values (SCALE, CSCALE).

      < unweighted and weighted counts of extra units (UEXC, WEXC) before the factor is applied.
      < UFREF.

      Provide the following counts only after collapsing:

      < weighted cell counts, (WEXCA) after application of the UFREF.

Refer to Tables 4 and 5 (2a and 2b respectively) in

Attachment H for an example of the desired output format. These tables will be used by DSMD to verify the collapsing process.

3.   Also, provide a hard copy of the overall UFREFs before collapsing.

G.   Mobile Home Ratio Estimation Factor

Before application of the MHREF, the weight is
BW x PR x GQRF x PSF x WCF x MCF x TAF x UFREF.

See Table 6 in Attachment H for an example of the format needed to display this output.

Provide a hard copy and an ASCII file with the following information for each set of collapsed geographic areas for each MSA (even if a MHREF was not computed for the MSA) and totals across all collapsed geographic areas:

<   weighted and unweighted counts of occupied mobile home units, vacant/URE, total mobile homes, Type A noninterviews and total conventional units before the factor is applied,
<   mobile home independent estimates for the collapsed areas,
<   mobile home ratio estimation factors,
<   weighted and unweighted counts of occupied mobile home units, vacant/URE, total mobile homes, Type A noninterviews and total conventional units after the factor is applied,
<   the overall mobile home ratio estimation factor.

H.   Independent Total Housing Unit Ratio Estimation Factor

See Table 7 in Attachment H for an example of the format needed to display this output.

Before application of the ITHUREF, the weight is
BW x PR x GQRF x PSF x WCF x MCF x TAF x UFREF x MHREF.

Provide a hard copy and an ASCII file containing the following information for each set of collapsed geographic areas for each MSA and the total across all collapsed geographic areas:

<   weighted and unweighted estimates of occupied non mobile home units, vacant/URE, total interviewed non mobile home units, out-of-

       scope interviews, Type A, Type B, and Type C noninterviews before the factor is applied.

- <   independent estimates.
- <   interviewed mobile home units after MHREF is applied and before ITHUREF is applied.
- <   adjusted independent estimates.
- <   independent total housing unit ratio estimation factors.
- <   weighted and unweighted estimates of occupied non mobile home units, vacant/URE, total interviewed non mobile home units, out-of-scope interviews, Type A, Type B, Type C noninterviews and interviewed mobile homes after the factor is applied.
- <   the overall independent total housing unit ratio estimation factor.

I.   Additional Requests

1.   Refer to Table 8 in Attachment H.

To complete this table, classify all vacants as either owner or renter units. Classify vacants as owner units when the variable **vacancy** has a value of 3, 5, 6, or 7.
Classify vacants as renter units when the variable **vacancy** has a value of 1, 2, or 4.

Provide DSMD with this table run separately for each MSA by each of the following:

- <   weighted and unweighted central city counts.
- <   weighted and unweighted balance counts.
- <   weighted and unweighted counts of each geographic area.
- <   weighted and unweighted occupied units, excluding vacants/UREs.
- <   unweighted Total MSA counts.
- <   Total MSA counts weighted only by the basic weight.
- <   Total MSA counts weighted using the final weight.

This table may also be requested at the county level at a later date.

2.   Median Suppression Threshold

Provide DSMD and HHES with the following information in the format of Table 9 in Attachment H:

<   unweighted count of interviews, including mobile homes. Be sure to exclude out-of-scope interviews.

<   independent estimate, taken directly from Attachment G (includes mobile homes).

<

$$Median\ Suppression\ Threshold = \frac{Independent\ Estimate}{Unweighted\ Interviews}\ x\ 2$$

median suppression threshold where

3.   Provide DSMD with a SAS file of all data needed to derive the counts in all of the weighting tables. Include all the variables used in the weighting plus the basic weight and all factors (including the final weight) output by the weighting.

4.   Provide mobile home and nonmobile home counts:

For each county/MCD in an MSA, provide a hard copy and an ASCII file showing interview, Type A noninterview* and Type B/C noninterview* counts for mobile homes* and nonmobile homes. In addition to counts requested, display the following geographic codes:

< AHS-MS code.
< state code.
< county code.
< MCDs (where applicable).

Refer to Table 10 in Attachment H for the output format.

If you have any questions, please contact Gayle Weant: Room 3785-3, ext. 1972.

Attachments (11)

cc:
A. Jean (2)   (DSD)
T. Blatt   "
D. Knoll   "
M. Butler   "
P. Donlin   "
D. Schwartz   "
S. Raudabaugh   "
C. Alexander   (DSMD)
D. Schwanz   "
C. Mylet   "
G. Weant   "
J. Kneesi   (HHES)

K:\AHS98\WGTRDSG.98
K:\AHS98\Tables

INPUT FILES

ASCII Files With Layouts

FILE	DESCRIPTION	POSITION	LENGTH
FILE-1	MSA Code	1-4	4
	Panel Reduction Factor	6-13	8
	Group Quarters Reduction Factor	15-22	8
FILE-2	Control Counts for UFREF		Table Format
FILE-3	MSA Code	1-4	4
	Geographic Area	6-7	2
	Mobile Home Collapsing Code	9-10	2
	Total Housing Unit Collapsing Code	12-13	2
	MSA Name	16-30	15

Quattro Pro File

dsdmhest   Monthly Mobile Home Controls   k:\ahs98
This file is in Quattro Pro, but we will convert it to EXCEL to send to DSD.

WordPerfect File

FILE-4   Type A and UFREF Cell Definitions   Table Format
      Stratum Codes
      Type A and UFREF Scale Values

SAS Dataset

FILE	DESCRIPTION	LOCATION
dsdctl98.ssd01	Monthly Housing Unit Controls	dsmde1: /ahsms/98wgt

GLOSSARY

Central City/Balance
    See Sector.

Conventional Units
    In-scope housing units that are not mobile homes.

Extra Units in the Unit Frame
    Housing units in the unit frame with serial numbers 02 and above.

Frame
    Identify the frame a unit is in by the FRAME code (position 19) on the UCF.
        U = unit frame   G = Group Quarters frame
        A = area frame   P = permit frame
        M = AHS-MS area/unit frame

Interviewed Housing Units
    Interviewed housing units consist of units that are
    <   regular occupied   -   variable **status** has a value of 1;
    <   URE occupied -   variable **status** has a value of 2;
    <   vacant   -   variable **status** has a value of 3.
    Out-of-scope units are included in this definition.

Mobile Homes
    Units having a value of 2 or 3 in variable **type**.

New New Construction
    Units in the permit frame where the permit year (position 138-141 on the UCF) plus 4 is
    greater than the survey year. That is, (permit year + 4) > survey year for all new new
    construction.

Occupied Interviewed Housing Units
    Regular occupied housing units and URE occupied housing units. (See definition of
    Interviewed Housing Units above.)

Old New Construction
    Units in the permit frame where the permit year (position 138-141 on the UCF) plus 4 is
    less than or equal to the survey year. That is, (permit year + 4) # survey year for all old
    new construction.

Out-of-Scope Units

> Units having a value of 5, 7, 8, or 9 in variable **type** and a value of 2 or 3 in variable **status**. This refers to URE/vacants in permanent housing units in transient hotels or motels; boats; recreational vehicles; caves; or tents and railroad cars.

Panel

> Located in positions 208-209 on the UCF.

Permit Subsampling Flag

> Located in position 200 on the UCF.

Permit Subsampling Factor

> The expected cluster size for our redesigned surveys is 4 units per segment in the permit frame. AHS-MS can have different cluster sizes ranging from 1-4 within a segment. AHS-MS planned to select 1-in-4 units out of each permit segment except when the segment had less than 4 units. In this case, we selected 1 unit per segment (i.e., we subsampled at 1-in-3 , 1-in-2, and 1-in-1). Since the basic weights assigned assumes a 1-in-4 sampling scheme, the basic weight needs to be adjusted to reflect the actual sampling.

PSU

> Located in positions 1-5 on the UCF.

Scale Values

> Scale values are assigned to each cell to indicate the order and priority in which one cell will collapse with another. When a cell does not meet the criteria specified in the collapsing instructions, it must collapse with at least one other cell.

Sector (Central City/Balance)

> Old Construction
>
> Determine sector designation for old construction units by the CBUR code (position 98) on the UCF.
>
> | 1 | = | 1990 Central City | (3 | = | Other Urban) |
> |---|---|---|---|---|---|
> | 2 | = | Balance | (4 | = | Rural) |
>
> Blank for New Construction.

> New Construction (Permit Frame)
>
> Determine sector designation for new construction units by the CBN code (position 97) on the UCF.
>
> | 1 | = | 1990 Central City |
> |---|---|---|
> | 2, 3 | = | Balance |
>
> Blank for Old Construction.

Stratum Codes

>For the unit frame, these codes were assigned to housing units based on tenure, rent, value, and number of rooms in structure during sample selection. For units in the unit frame, stratum codes are located on the UCF (position 201-203). For units in the area and area/unit frame, stratum codes are assigned in a preweighting procedure.

Tenure

>Occupied housing units
>Tenure status for occupied housing units is determined by variable **tenure**.
>1 = owners; 2, 3 = renters.

>Vacant housing units
>Tenure status for vacant housing units is determined by variable **vacancy**.
>1, 2, 4, 11 = renters; 3, 5, 6, 7, 8, 9, 10 = owners

Type A Noninterview Units

>Occupied units
>Units having a value of 1, 2, 3, 4, 5 or 6 in variable **noint** and **vacnoint** is blank.

>Vacant/URE units
>Units having a value of 6 in variable **noint** and a value of 1 in **vacnoint**.

Type B Noninterview Units

>Units having a value of 10, 11, 12, 13, 14, 15, 16, or 17 in variable **noint**.

Type C Noninterview Units

>Units having a value of 30, 31, 32, 33, 36, 37, or 38 in variable **noint**.

URE (Ususal Residence Elsewhere)

>Interviewed units
>Units having a value of 2 in variable **status**.

>Noninterviewed units
>Units have a value of 4 in variable **status** and a value of 1 in variable **vacnoint and** a value of 6 in variable **noint**.

Vacant Units

>Interviewed units
>Units having a value of 3 in variable **status**.

>Noninterviewed units
>Units have a value of 4 in variable **status** and a value of 1 in variable **vacnoint** and a value of 6 in variable **noint**.

Weighting Control Factor (WCF)

A weighting control factor adjusts the probability of selection to reflect subsampling that takes place after the initial sample selection. These factors are obtained from Field and from files (containing large cluster subsampling) provided by DSMD.

Zero Segments

Determine whether a unit is a zero segment by the variable **zeroseg** on the master file.

>1= = zero segment,   > = = not a zero segment